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ABSTRACT

A study surveyed 241 high-achieving youth aged 15-25 regarding how innovation can be made sustainable among youth in Canada. Results were insightful and pointed to actionable steps for the Youth Action Council for Sustainable Innovation and the federal government. Findings indicated the following: youth can be more innovative if they have the right environment and the right tools; innovation has a broad range of meanings, and youth think about innovation in broad terms; young innovators/entrepreneurs believe that access to capital remains a barrier to innovation; youth believe there is a lack of information/databases on the subject of innovation; youth want more opportunities for mentorship and cooperative entrepreneurship programs in Canada; Canada's most innovative youth are highly mobile; the educational system suppresses innovation in youth; youth point to the need for multidisciplinary approaches to problem solving, innovation, and community building; a broad array of factors contributes to making someone innovative, many of which fall outside the boundaries of the core educational curriculum; youth regard an innovative person as strong in soft skills; youth feel strongly that development of human capital is the cornerstone of developing innovation skills; and focusing efforts on children is most likely to instill innovation skills that will last a lifetime. (Exhibits include methodology and focus group materials.) (YLB)

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Sector Reports

Youth Action Council on Sustainable Innovation (YACSI) Report : Making Innovation Sustainable among Youth in Canada

October 7, 2002

Prepared by: ***Precision Management Catalysts***

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Executive Summary

The Youth Action Council for Sustainable Innovation (YACSI) is pleased to present a report on the subject of youth and innovation in Canada. The report surveys a broad cross-section of 241 high-achieving youth. The results were insightful and pointed to actionable steps for both YACSI and the federal government. The findings of the report include:

- Youth can be more innovative if they have the right environment and the right tools.
- Innovation has a broad range of meanings. Youth think about innovation in broad terms.
- Young innovators/entrepreneurs believe that access to capital remains a barrier to innovation.
- Youth believe there is a lack of information/databases on the subject of innovation.

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- Youth want more opportunities for mentorship and co-operative entrepreneurship programs in Canada.
- Canada's most innovative youth are highly mobile.
- The educational system suppresses innovation in youth.
- Youth point to the need for multidisciplinary approaches to problem solving, innovation, and community building.
- A broad array of factors contributes to making someone innovative, many of which fall outside the boundaries of the core educational curriculum.
- Focussing efforts on children is most likely to instil innovation skills that will last a lifetime.

Innovation is an important competitive advantage. We must ensure that all youth in Canada are equipped to deliver better ideas and to find ways to implement them. The YACSI report concludes that Canada should focus efforts towards creating and nurturing a culture of innovation among youth and the organizations that serve them. In order to create a durable cultural shift, YACSI proposes to expose youth to innovative thinking tools and environments from an early age.

YACSI is an action-oriented organization that will leverage the passion, knowledge, and skills of its partners that serve youth, between the ages of seven and 25, to create a culture of innovation. By systematically immersing youth in a culture of innovation, in addition to providing them with tools and skills for innovation, YACSI believes that young innovators will be created purposefully in Canada.

YACSI's Role:

- Provide an open forum for stakeholders
- Gather information on best practices and success stories
- Share best practices and success stories with stakeholders
- Facilitate experimentation through connection and networking
- Facilitate sharing of innovation tools, learning programs, and other resources

"The world we have created today has problems that cannot be solved by thinking the way we thought when we created them."
- Einstein

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Introduction

In response to the federal government's call for input into the innovation agenda, an ad hoc consortium of parties united to form the Youth Action Council for Sustainable Innovation (YACSI.) **YACSI is a catalyst organization that will work in conjunction with a broad spectrum of partners, whose target audiences include youth between the ages of seven and 25, to introduce and nurture a culture of sustainable innovation in Canada.**

YACSI believes that allocating resources to the development of our youth is pivotal if Canada is to succeed at becoming one of the top innovative countries in the world. By focussing significantly greater efforts on youth, we will be more likely to make a durable cultural shift towards sustainable innovation - a shift that will stick.

Culture is seminal in the life of a young person. Examples abound. In classical times, Sparta produced warrior children, while Athens produced thinkers and was the birthplace of democracy. YACSI suggests that a culture of innovation can be achieved with a sustained and long-term effort in a nurturing environment that also systematically provides innovation skills training. A cultural shift cannot be forced; it is best grown, over a long period.

Over the next 20 years, YACSI can envision a surge of Canadian innovation, entrepreneurship, creativity, risk taking, leveraging of human talent, and successful change, which will reverberate throughout all social, economic, technological, cultural, and artistic sectors. When someone on the other side of the world casually mentions a Canadian in 20 years, YACSI believes the word will trigger and evoke images of a person who can figure out a better way - whether it is in business, sports, the arts, or social innovation. **YACSI can play a significant facilitative role in creating a Canadian brand identity - people who can figure out a better way.**

In its formative stages, leaders in Canadian innovation have joined forces to supply **YACSI** with the necessary knowledge and resources to undertake its objective - **Magna International**, the automotive components manufacturer based in Aurora, Ontario with more than 63,000 employees worldwide, and **Shad International**, an organization of excellence with a track record of developing innovative leaders. **Innovation Management Association of Canada (IMAC)** also contributed to the development of the YACSI vision.

The YACSI Report will present results of focus groups conducted with 241 of the most innovative youth across Canada.

The YACSI Report was researched and created by **Precision Management Catalysts**, in association with Ideaction, and was funded with the financial support of the **Innovation Secretariat, Industry Canada**. The researchers and authors of this report thank everyone who has helped to bring the YACSI initiative to fruition.

The report will address the following question: *How can innovation be made sustainable among youth in Canada?* We will frame the discussion into the challenge areas' questions outlined in Industry Canada's Do-it-Yourself Kit, addressing the *Knowledge Performance Challenge, Skills Challenge, and the Strengthening Communities Challenge*.

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Methodology

The target population for this study is high-achieving Canadian youth between the ages of 15 and 25. To identify and speak with members who fit this profile, the researchers contacted four organizations including Advancing Canadian Entrepreneurship (ACE,) Magna International (*As Prime Minister Awards* finalists), Shad International (Shad Valley,) and Canadian Youth Business Foundation (CYBF.)

In total, 222 students who were attending the Shad Valley program in

July, 2002, two youth members of ACE, two youth members of CYBF, and three finalists for the *As Prime Minister Awards* participated in a series of six focus groups. A further 12 *As Prime Minister Awards* finalists completed surveys via e-mail. The total number of youth who provided input was 241.

On the subject of limitations, future research should endeavour to study youth from a broader cross-section of organizations. Also, because the target population of this report is high-achieving youth, targeting a general cross-section of Canadian youth would likely provide interesting comparisons with the present report. (Refer to Exhibit 1 for complete details on methodology.)

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Knowledge Challenge

The greatest obstacle to discovery is not ignorance, it is the illusion of knowledge."
- Daniel Boorstin

YACSI believes that innovation is for everyone. Productivity gains can be achieved by developing, and broadly introducing, new knowledge across the Canadian economy. Marketing, sales, operations, finance, and human resources are areas where innovation has practical application in most Canadian businesses. Harnessing the power of innovation across broad sectors and divisions will ensure that Canada optimizes the innovation opportunity.

Targets

1. **Are the targets appropriate to ensure that Canada gets better performance from its R&D investments?**

The following knowledge targets are identified in the *Achieving Excellence* document:

- By 2010, rank among the top five countries in the world in terms of R&D performance.
- By 2010, at least double the Government of Canada's current investment in R&D.
- By 2010, rank among world leaders in the share of private sector sales from new innovations.
- By 2010, raise venture capital investments per capita to prevailing U.S. levels.

Focus-group respondents, who were entrepreneurs, revealed that insufficient access to capital remains one of the top constraints to their development. Consequently, our research supports the target of increasing venture capital and other types of financing. Regarding the other targets, it is important to examine the scope of innovation.

The *Do-it-Yourself Kit* defines "innovation" as:

> *"Everybody's Business. Innovation simply means finding ways to do things better than before. It means a country in which everybody strives for excellence. It means a*

personal effort to contribute to Canada's economic performance for the benefit of us all. That's why we should all get involved."

Despite the broad definition of innovation and a call to action for everyone to get involved, the target question focuses narrowly on R&D. Small and medium-sized enterprises (SMEs) employ more than 80 percent of all workers and create the majority of Canada's wealth. While we are unsure of the precise percentage of R&D workers in Canada's workforce, it is fair to say that it is quite small.

We believe that the targets for the knowledge challenge should be expanded to reflect the broad-based contribution that non-R&D sectors will make in the creation of new knowledge, which will have the effect of improving productivity at these firms. The greatest rewards in the new economy accrue to organizations that create new business models or processes - ideas that spark new sources of revenue or new and better services based on changing technology, demographics, or consumer habits.

Challenges

2. **Major Challenges: What are the main challenges to developing new ideas and commercializing them?**

Terminological Confusion and Interchangeability

When we asked youth about innovation, they shared a wide variety of responses. It became clear that innovation means different things to different people. This causes confusion. When terminology such as R&D, entrepreneurship, creativity, innovative thinking, ideas, problem solving, and knowledge are used synonymously and interchangeably with innovation, it clouds and sometimes narrows the interpretation of innovation. This makes it difficult for most Canadians to understand what innovation really is, and how they can get involved to help.

Interestingly, R&D was not even raised by the younger Shad Valley participants, when they were asked to share what innovation meant to them. In the focus group with older youth in their 20s, two out of seven respondents referred to R&D when they were asked what innovation meant to them - hardly the primary focus. Most Canadians do not work in R&D, hold a Ph.D., or wear a white coat and goggles at their workplace. How does the Innovation Strategy affect the rest of us?

What is Innovation?

The OECD defines innovation quite broadly as *"the process through which new economic and social benefits are extracted from knowledge."*[1] When focus-group respondents were asked about their views on innovation. Responses converged on the following themes.

[1] Source OECD as cited in "Canada's Strategy: New Ideas, New Opportunities", Technical Backgrounder, http://www.innovationstrategy.gc.ca/cmb/[...]

Innovation Discussion Themes

- Imagination is the spark for creativity.
- Creativity fuels innovation.
- Innovation results from focusing creative resources on an issue and ensuring the outcome is implemented.
- The imagination-creativity-innovation-implementation process should be fostered and encouraged.
- Innovation is relevant to all disciplines, and there are thinking principles that are common to all.
- While individuals can innovate, teamwork and group input can enhance all aspects of the innovation process.
- Programs such as Shad Valley and ACE help their students experience all aspects of the innovation process by encouraging risk-taking in a supportive environment.
- People require regular blocks of time dedicated to playing with new concepts and ideas.

Results reported by respondents are consistent with findings from Harvard[2]; from an extensive analysis of the world's top long-term performing companies[3]; and from an in-depth review of the power of ideas in the knowledge economy.[4] What is known to date suggests that innovation is at the heart of increasing productivity and improving the Canadian standard of living. Innovation is important!

[2] http://harvardbusinessonline.hbsp.harvard.edu/b02/en/common/[...]

[3] Weirsema, F., *The New Market Leaders*, New York, Free Press: 2001, p: 5 - 6.

[4] Wujec, T. and S. Muscat, *Return on Imagination*, New York, Prentice Hall: 2002, p: 26 - 39.

According to the respondents, innovation can be both a result and a process. Regarding the process, respondents suggested that it

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consists of three parts:

1. Stage one: **creation of concept** Innovators employ creativity to generate a new idea, or combine previously existing ideas in a new manner.

2. Stages two and three: **testing and implementation** Older respondents with first-hand experience in running businesses stated that testing and implementation is a key part of the process, involving many activities that either end with the adoption of the innovation, return to testing, or return to stage one - concept creation. Innovators continually question and re-question viability.

Respondents mentioned other important factors that spark innovation. They indicated that innovation is an exciting but uncertain process, in which risk and failure are inherent. Respondents believe that failure is a useful stepping-stone to future success. So does ACE, believing that their members are not trying hard enough if they have not encountered failure. Equally important are role models, according to the respondents, to habitually reinforce self-confidence and winning attitudes in youth.

Respondents also agree that patience is required since innovation can be a long-term process. In some cases, innovators should be prepared to invest a lot of time. When asked about the process to invent the light bulb, Thomas Edison said, "*I never failed once when I invented the light bulb. It just happened to be a 2,000-step process.*" In the spirit of Edison, focus-group respondents indicate that innovation is for those who have the tenacity, stubbornness, and long-term commitment to make it pay off.

Inhospitable Climate for Innovation

Focus-group respondents reported that new ideas are often ridiculed, ignored, and otherwise marginalized by individuals who are not as innovative. New ideas that question the established order of thinking are often mistrusted by authority figures. Respondents sometimes refer to this as linear thinking or negative energy.

Consequently, innovative and creative thinkers are sometimes lured into thinking that, "the best way to get along, is to go along,"[5] and they begin to mirror the *status quo*, first in the educational system and later, when they enter the work world. The suppression of innovative or creative energy is inversely related to age. All other things being equal, people become less innovative as they grow older, according to focus-group respondents. This is why they believe the focus on innovation should start at an early age.

[5] Stan D. Lawlor, "Lecture Notes: Sociology 4015", mimeo, 2002

Insufficient Risk/Venture Capital

Older respondents indicated that a lack of capital was preventing them from expanding their businesses and non-profit organizations. Accordingly, they suggested that the government focus on providing additional resources of this type to young entrepreneurs.

YACSI's Innovation Vision

4. **What can you do (for your organization, community, region or sector) to support increasing Canada's performance in developing and marketing new ideas?**

Refer to Section Skills Challenge, Question 4 for YACSI's vision.

YACSI's Commitments, Actions, and Timelines

5. **Commitments, Actions, Time Lines: What are you able to do over the next year? The next five years? What should others (government, business, communities) do?)**

Refer to Section Skills Challenge, Question 5 for YACSI's commitments, actions, and timelines.

National Issues

6. **National Issues: What knowledge performance issues must be dealt with at the national level?**

Our research indicates that youth's perspective on innovation is broad. The government can lead by ensuring that new ideas and knowledge are the focus of the innovation strategy, wherever they originate, in a lab or otherwise.

In addition to the topic of innovation, our research also encompassed the topic of ethics as it relates to innovation. Within the focus groups, there was a strong sentiment that, with respect to ethical issues, there should be a full-scale attempt to research the impact of new innovations. Respondents also believed that a responsible government would work to educate the public on the issues fairly and without bias. The Shad Valley University of New Brunswick group recommended that, "*The government should always use public opinion as a barometer,*" and added that a referendum should be used as a decisive tool for action. They also believed strongly that a poll should be conducted on Canadian youth regarding important ethical issues as they relate to innovation.

When asked where their ethical orientation originated, many respondents credited family and friends, and a strong contingent of them identified teachers.

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Skills Challenge

"Imagination is more important than knowledge."
- Dr. Albert Einstein

The most formidable challenge facing businesses, organizations, and government is the recruitment of and selection of candidates who possess skills that have currency in the labour market. Demographic trends bear considerably on the skills challenge. Rapid advances in technology and fluctuating business cycles of a market economy make it even more difficult to predict what skills will be required at any given time.

The technology meltdown, that has thrown a considerable number of skilled workers out of work in the past two years, has created a high degree of uncertainty in Canada about what skills will be required for the new economy. Why is the technology sector built on a house of cards, if the skills of its workforce are of such ostensible value? Is our human resource planning on track in Canada?

In order to shed light on the skills challenge, youth were invited to share the skills and attributes that they believed to be the hallmark of an innovative person. Their responses follow:

Skills	Attributes
■ Imagination ■ Critical thinking ■ Thinking creatively ■ Listening skills ■ Interpersonal skills ■ Teamwork skills ■ Positive attitude ■ Risk-taking skills ■ Adaptability ■ Patience ■ Resourcefulness ■ Self-confidence ■ Presenting skills ■ Ability to think outside the box ■ Curiosity and questioning the order of things ■ Cross-disciplinary training ■ Broad base of knowledge ■ Ability to detach oneself from ego	■ Ability to be proactive and foresee future trends ■ Ability to live outside one's comfort zone ■ Ability to draw from abstract thoughts ■ Ability to think about needs in society other than one's own ■ Problem-finding skills and problem-solving skills ■ Practical intuition for the ■ Ability to recognize when others' ideas are good ■ Research skills (e.g., finding disparate sources and applying them to theories and themes) ■ Stubbornness (trust in one's own research)

Most of the youth regard an innovative person as strong in soft skills, such as interpersonal/emotional intelligence, communication, and teamwork. The findings are similar to the Employability Skills 2000+ document, prepared by the Conference Board of Canada.

The Conference Board of Canada focuses on the categories of personal management skills, teamwork skills, and lastly, fundamental skills that comprise thinking and problem-solving skills, information-management skills, communication skills, and numeracy skills.[6]

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[6] http://www.conferenceboard.ca/education/learning-tools/esp2000.pdf

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Focus-group respondents felt strongly that the development of human capital is the cornerstone of developing innovation skills. After all, technology does not create knowledge, people do; businesses do not

develop better products and services, people do.

Targets

1. **Targets: Are the targets appropriate to ensure that Canada has a skilled work force to participate effectively in the new economy?**

- Through to 2010, increase the admission of Master's and PhD students at Canadian universities by an average of 5 percent per year.
- Over the next five years, increase the number of adults pursuing learning opportunities by 1 million.
- By 2004, significantly improve Canada's performance in the recruitment of foreign talent, including foreign students, by means of both the permanent immigrant and the temporary foreign workers programs.
- Ensure that our immigration policies get us the skilled workers we need.

The current targets focus on adults and university-aged Canadians and immigrants. Individuals possessing a graduate education represent only a very small part of Canadian society. We support the focus on increased adult-learning opportunities, but we need to ensure that these opportunities will instil innovation skills in students. We recommend creating a new target for youth in Canada:

- By 2012, ensure that every youth in Canada has basic innovation skills by the time he or she turns 25 years old.

YACSI also proposes that the federal government add a target to reflect what youth believe to be important about innovation in Canada. Youth are concerned with employment. Typically, youth unemployment soars above the national average. If youth are provided with appropriate innovation resources and surrounded by a nurturing innovative environment when they are young, they should have innovation-skills advantages when they reach working age. This should cause an increase in labour-market opportunities through avenues such as entrepreneurship, with a resulting decrease in youth unemployment.

As a result of these youth concerns regarding employment, the federal government should consider youth targets such as the following examples:

- By 2010, target a decrease in the youth unemployment rate to the general unemployment rate in Canada; and
- By 2007, double the yearly rate of youth start-up businesses in Canada.

By engaging youth in an exciting culture of innovation, they will be equipped with a skill set that will allow them to pursue entrepreneurial careers, engage in research, create revolutionary social programs to address hunger in the developing world, or any number of exciting opportunities that will propel them forward. Canadian youth will also be well equipped to meet the demands of employers who will need more innovative, empowered workers with strong critical-thinking, teamwork,

and communication skills.

We anticipate that within the first few years, in part, as a result of YACSI's efforts, a higher percentage of increasingly innovative young workers will enter the Canadian labour force with the requisite orientation and skills.

Challenges

2. **Major Challenges: What are the main challenges to ensuring a supply of highly skilled people?**

According to the results of the focus groups, the following issues bear on the skills challenge.

Educational System Suppresses Innovation in Youth

While a few respondents mentioned the educational system's role in supplying baseline knowledge for young people, the majority of respondents characterized the educational system as a suppressor of innovation. Teachers focus on solutions and not on problems. If students provide solutions that teachers anticipate and that are identified in the required books, then the answers, almost certainly, are right. Other respondents felt that teachers are too helpful, stifling students' ability to think for themselves. Most of the respondents displayed a surprisingly weak attachment to the educational system.

The following two quotes demonstrate how respondents' believe that innovation is stifled by the educational system:

> *"At school, the whole process is one of* ***information regurgitation****. Schools look for standardized ways of assessing large numbers of people."*

> *"****School prevents innovation****. Some programs force you to repeat the same things - regurgitate information to professors. For example, engineering labs sometimes drill innovation out of students by teaching thinking in a way that is too structured and does not allow students opportunities to think for themselves."*

While respondents relayed their beliefs that the educational system suppresses innovation, they shared with us the following positive experiences that were the **exception rather than the rule**:

- Teachers with unconventional teaching styles
- Imagination used in younger grades
- Gifted programs that encourage students to try new things
- Teachers teaching without books
- Workshops allowing students to learn or do something differently
- Interactive lectures/classes
- Learning without teachers
- Being forced to teach
- Open-ended assignments

- Problem-based learningLearning through understanding rather than memorization

Insufficient Mentorship

Respondents indicated that access to innovation/entrepreneurial role models and mentors is limited in Canada. Those who had started businesses indicated that a lack of mentors would inhibit their ability to innovate.

Canada's Most Innovative Youth are Highly Mobile

During the focus groups, youth were asked if they would consider taking a position outside of Canada, if the position were innovation-oriented. Interestingly, both the younger and older participants seemed equally receptive to considering the proposition; 88 percent of the Shad Valley students responded affirmatively. An even a higher number of the *As Prime Minister Awards* finalists, ACE, and CYBF respondents told us, "Yes." Clearly, high-achieving youth have a strong attachment to the idea of working under conditions that they perceive as innovative. Innovative youth are also attracted to other countries.

Many respondents shared a common sentiment that a major reason to go abroad would be to return to Canada with increased experience and knowledge. None of the participants suggested that they would leave Canada permanently, although we did not specifically ask them this question. We also asked what other factors would influence their decision to a take position abroad. Responses included:

- Quality of life
- Salary
- Creativity
- Challenge
- Exposure to other cultures
- Challenge of working in developing nations
- Opportunity to make a difference in developing nations
- Feelings of increased self worth through working with developing nations
- Bettering oneself as a person
- Depends on the country
- Depends on the distance from Canada
- Family status
- Economics
- Political and social stability of the country
- Environmental conditions
- Weather
- Culture

Priorities

3. **Government of Canada Priorities: Do you think the proposed Government of Canada priorities help you to address these challenges?**

Yes. The priorities will help address these challenges. We suggest considering the following priorities as well:

- Support YACSI to ensure all Canadian youth are equipped with innovative thinking as a core skill set.
- Expand the co-operative research program to include entrepreneurship opportunities for youth in Canada.
- Support mentorship programs in the areas of entrepreneurship and innovation.
- Focus on providing Canadian youth with world-class learning and experiences around the world, and developing networks for individuals to share information while abroad.

YACSI's Innovation Vision

4. **Your Innovation Vision: What can you do (for your organization, community, region or sector) to support skills for the new economy? For example, does your organization need to provide a better environment to encourage people to pursue academic training or research opportunities?**

YACSI's vision is to promote sustainable innovation in Canada through championing the Canadian youth innovation perspective.

YACSI's primary **objective** is to act as a consultative organization that will study and share knowledge that fosters a culture of innovation in organizations serving youth in all areas (e.g., sports, arts, culture, education, and business.)

To achieve its objective, YACSI proposes to:

- Leverage the passion, knowledge, and skills of organizations, businesses, associations, schools, and universities (Implementation Partners) that have ready-access to young Canadians.

- Facilitate the circulation and development of innovation tools, resources, and learning programs, and share them with its Implementation Partners to facilitate youth innovation in Canada.

- Leverage the work of research partners to study organizations that contribute to making young Canadians more innovative, in order to:
  - Map the organizations supplying services to youth aged seven to 25, and study the programming offered by each organization; and
  - Identify how innovation relates to youth and how youth can become more engaged in innovation.

- Act as a permanent forum:
  - Where all public, private and not-for-profit organizations can debate the issue of making all young Canadians more innovative; and
  - Where all the partners can build consensus and synergy regarding youth innovation.

By implementing the foregoing objectives, YACSI proposes to make a considerable contribution to Canada's ambitious goal to become one of the five most innovative countries in the world. We will strive to

ensure that young Canadians of all ability levels and socio-economic stations have access to the tools, skills, and resources to:

- contribute to the development of new and useful ideas; and
- understand how to create, and implement, and market new ideas when needed.

YACSI's Commitments, Actions, and Timelines

5. **Commitments, Actions, Time Lines: What are you able to do over the next year? The next five years? What should others (government, business, communities) do?**

In order for YACSI to have the maximum impact, YACSI will work to collaborate and partner with individuals and organizations including:

- **Experts** who will form an **advisory board**
- **Implementation Partners** (all organizations that serve youth)
- **Exceptional educators** and **teachers**, and **program specialists** from a wide array of backgrounds and all levels of education (who currently lead peers and students by example)
- **Research organizations** (to continuously build on the current base of knowledge)
- **Not-for-profit** (to leverage their experience with innovation and leadership)
- **Private sector** (for financial and intellectual capital support, role modelling, and leadership)
- **Government** (for financial and intellectual capital support, role modelling, and leadership)

In the **next year**, YACSI proposes to address the federal government's challenges by:

- **Holding a conference** that will bring together a broad cross-section of organizations and individuals on the subject of youth innovation to debate the practical issues associated with making youth more innovative.
- Working with Implementation Partners to **plan research** among all organizations that contribute to making young Canadians more innovative, by identifying, addressing and sharing the:
  - **current best practices and success stories;**
  - **key challenges facing young Canadians; and**
  - **innovation tools, resources, and learning programs** they require to make young Canadians more innovative.

Over the **next five years**, YACSI will focus on the following priorities:

- **Act as a permanent forum:**
  - Where all experiences can be shared.
  - Where governments as well as public, private and not-for-profit organizations can debate better ways of making all young Canadians more innovative.
  - Where new partnerships can be continuously created to "make it happen."

- **Establish a database** of innovative programs, associations, successful case studies, youth role models, and innovative

processes and tools in business, education, sports, arts, and other fields. The database will showcase what is being tried, where, identify the lead, and detail the results and costs.

- Continue to **identify best practices, resources, and success stories** in organizations that serve youth.

- **Co-brand and partner** with benchmark organizations in youth innovation such as 4H, ACE, Junior Achievement, in order to facilitate an annual innovation challenge and/or conference.

- Facilitate the **circulation and development of innovation resources** (e.g., tools, resources, and learning programs.)

- **Launch an interactive Web site** to provide access to research findings similar to the American's Innovation Network[7] and also to facilitate research with young Canadians on the topic of innovation. This site would be similar to the Information Association of Canada's (ITAC[8].) This type of tool would allow ongoing communications with key stakeholder groups such as children, teenagers, teachers, parents, employers, NPOs, volunteer groups, associations, young entrepreneurs, and training ministries.

- **Partner with academic researchers and institutions** to establish longitudinal benchmark studies to assess and compare innovative programs and processes such as the University of Toronto's Innovation Systems Research Network[9], and McMaster University's Management of Innovation and New Technology Research Centre[10]

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[7] http://www.thinksmart.com/index.html

[8] http://www.itac.ca/

[9] http://www.utoronto.ca/isrn/links.htm

[10] http://mint.mcmaster.ca/mint/others.htm

National Issues

6. **National Issues: What innovation skills issues must be dealt with at the national level?**

Sources of Innovation

Many of the innovative youth we interviewed hailed from a larger pool of innovative youth, and we discovered that a good number were truly exceptional. They reported that their capacity to innovate originated from a wide range of experiences outside the schools. Respondents suggested the following factors contributed to their ability to innovate:

- Participating in arts and music
- Participating in sports (teaches youth to lose and win, and to

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keep trying)
- Participating in improvisation and humour (experience of unexpected lateral leaps)
- Participating in new endeavours (e.g., sports, hobbies, games, Internet, volunteering)
- Meeting and working with different people from different cultures
- Co-operative programs
- Travelling to new places
- Positive feedback, encouragement at work and from friends
- Role models
- Supportive environments
- Access to information and knowledge (libraries and Internet)
- Getting involved
- Participating in programs such as ACE and Shad Valley
- Starting businesses/not-for-profits
- Relationships with family and friends
- Environmental clubs / experiences
- Benchmarks for creativity and innovation

Based on the youth's perceptions regarding how they became innovative, we suggest the federal government should focus its efforts and resources on a wide array of organizations, programs, and initiatives, as noted in the preceding bulleted list.

With the calls from all sectors of major global economies for continuous innovation, the key now is to innovate the innovation process, learn what works, where, why, and how, and then to widely and quickly disseminate the best practices and success stories. Canada must be the first country to identify better and more innovative ways of ensuring that youth become more systematically innovative.

The federal government can lead by:

- Supporting the development of YACSI and its partners.

- Ensuring government programs, such as the Youth Employment Strategy, work in close consultation with YACSI to ensure that innovation plays a paramount role.

- Assisting all groups working with young Canadians to make a priority of innovation and innovative environments.

- Making innovation, change management, and teamwork training more available for all age levels.

- Making the federal government a role model of innovation and innovation behaviour, training a cadre of experts who can be deployed to the private sector by:
  - Equipping government employees with innovation skills;
  - Treating innovative thinking as a core competency for each government position; and
  - Training government managers to manage innovation.

Recently, in the December 10th, 2001 federal budget, Industry Canada invested several million dollars in the Canadian Youth Business Foundation, whose mandate includes mentorship of young entrepreneurs. While this is an excellent start, the respondents report

that the need for mentorship amongst youth in Canada is great. Accordingly, we suggest that the federal government move further on this issue.

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Strengthening Communities Challenge

T.E.A.M. =
Together Everyone Achieves More"

Targets

1. **Targets: Are the targets appropriate to ensure Canadian communities attract investment and remain great places to live?**

- By 2010, develop at least 10 internationally recognized technology clusters.
- By 2010, improve the innovation performance of communities across Canada to bring the benefits of innovation to every part of the country - rural and urban.
- By 2005, ensure that high-speed broadband access is widely available to Canadian communities.

Respondents suggested that using a formal process of developing clusters (centres for innovation) is a proven method. "Witness the technology triangle in Waterloo," said one respondent. The YACSI platform is premised on developing clusters/communities of innovation in all parts of Canada - rural and urban, using pre-existing organizations, associations, and institutions as our legs on the ground. The importance of using technology to achieve this goal, in a country the size of Canada, cannot be under estimated. Respondents indicated that broadband technology is the answer for Canada's communication and innovation challenges. With broadband, vast geographic challenges are bridged efficiently and in real time.

Thus, the targets identified by Industry Canada are on track.

Challenges

2. **Major Challenges: What are the major challenges in developing Canadian communities into clusters for innovation?**

Lack of Forums and Databases for Youth Innovation

Respondents indicate that when innovators lack information, they encounter roadblocks in the innovation process. Innovators require access to shared information. Respondents suggest using the Internet, which offers unprecedented opportunities for sharing innovative ideas. At this time, Canada lacks proper forums and databases to share this information.

Refer to Question 2 in the Skills Challenge for additional information relating to mentorship.

Priorities

3. **Government of Canada Priorities: Do you think the proposed Government of Canada priorities help you to address these challenges?**

The Government of Canada's priorities are substantially on track. We would encourage the federal government to maintain a broad view of the technology clusters, to include any project that is innovative in nature.

YACSI will assist in strengthening the innovation performance of communities. In accordance with the government's suggestion, we will work with all partners, public and private, to ensure that concrete improvements occur at the community level.

YACSI's Innovation Vision

4. **Your Innovation Vision: What can your community do to become a cluster of innovation? What is required? What must others (government, business, community leaders) do?**

Refer to Section Knowledge Challenge, Question 4 for YACSI's vision.

YACSI's Commitments, Actions and Timelines

5. **Commitments, Actions, Time Lines: What can you do over the next year? The next five years? What should others (government, business, communities) do?**

Refer to Section Knowledge Challenge, Question 5 for YACSI's commitments, actions, and timelines.

National Issues

6. **National Issues: What innovation issues must be dealt with at the national level?**

Refer to Sections Knowledge Challenge and Skills Challenge, Question 6.

Final Thought

"Whether you think you can, or you think you can't - you're right!"
- Henry Ford

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Exhibit 1 - Methodology

Sampling Design

The researchers targeted high-achieving Canadian youth between the ages of 15 and 25. To identify and speak with members who fit this profile, the researchers contacted four organizations including

Advancing Canadian Entrepreneurship (ACE,) Magna International (*As Prime Minister Awards* finalists,) Shad International (Shad Valley,) and Canadian Youth Business Foundation (CYBF.)

YACSI nine Shad Valley campuses, with a total of 458 student who were attending the program in July 2002, to participate in the focus-group initiative. Five of nine campuses agreed to hold a focus-group session. In total 222 Shad Valley students participated. ACE provided access to three of its youth members, and two participated. CYBF provided access to four of its youth members, and two participated. Magna International provided access to 47 finalists for the *As Prime Minister Awards*, and 14 participated. All told, 241 out of 512 targeted youth participated in this study for a response rate of 47.1 percent.

Research Design

Due to the depth of answers required for this study, the researchers chose to implement a series of focus groups to open discussion and facilitate debate. The weakness of this approach is that statistical analysis of answers is not possible. Five focus groups were held with Shad Valley students. One focus group was held for CYBF, ACE, and *As Prime Minister Awards* finalists, and a final survey was e-mailed to *As Prime Minister Awards* finalists to increase responses from this group.

Linda Wilson facilitated the first focus group of 52 students at the McMaster University Shad Valley campus in Hamilton, Ontario. (Refer to Exhibit 2, Focus Group Instrument 1.) The answers garnered from that focus group were used to modify the survey instrument for the following focus groups. (Refer to Exhibit 3, Focus Group Instrument 2.) Linda Wilson facilitated a focus group of 50 Shad Valley students at the Lakehead University Shad Valley campus in Thunder Bay, Ontario. Dr. John Pliniussen facilitated a focus group comprising 60 students at the University of Calgary Shad Valley campus in Calgary. Dr. Brian Hunter facilitated a focus group of 50 Shad Valley students at Queen's University Shad Valley campus at Herstmonceux Castle, U.K. Marissa Olanick facilitated a focus group of 10 Shad Valley students at the University of New Brunswick Shad Valley campus in Fredericton, New Brunswick.

The answers garnered from the Shad Valley focus groups were used to modify the survey instrument for the following focus group. Linda Wilson facilitated a teleconference group comprising three *As Prime Minister Awards* finalists, two youth members of ACE, and two youth members of CYBF. (Refer to Exhibit 4, Focus Group Instrument 3.) The remaining 44 targeted *As Prime Minister Awards* finalists were e-mailed the focus group questions as a survey; of those, 12 responded with completed surveys.

Data Collection

For the first five face-to-face focus groups, Shad Valley staff captured data using a computer to transcribe respondents' comments while the focus groups were in progress. For the teleconference focus group, Linda Wilson and Stan Michael Lawlor of Precision Management Catalysts transcribed respondents' comments using a computer while

facilitating the session. All surveys and focus-group notes completed by parties other than Precision Management Catalysts were returned to Linda Wilson.

Data Analysis

The results from the five focus groups of Shad Valley students were synthesized into one set of responses and kept discrete from the focus group notes of the older youth. This was done to differentiate between the Shad Valley youth and the youth from CYBF, ACE, and the *As Prime Minister Awards* finalists. Surveys returned by e-mail were used in conjunction with the focus-group notes of older youth, since they were from the same target audience.

Limitations

At first glance, it appears that the study is unevenly weighted with responses from Shad Valley students. However, because this study did not use statistical analysis, this issue should not be considered a limitation. Nonetheless, while there were 241 youth surveyed in this study, research on this project was limited by the number of organizations serving youth that provided access to candidates. While the responses from all the groups were consistent, future research should endeavour to expand the number and cross-section of organizations providing youth candidates for study. Also, because the target population of this report is high-achieving youth, looking at a general cross-section of Canadian youth would likely provide interesting comparisons with the present report.

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Exhibit 2 - Innovation Focus Group (McMaster University Shad Valley)

Instructions to Facilitators/Notetakers:

Thank you for agreeing to facilitate a focus group on behalf of the Youth Advisory Committee on Sustainable Innovation (YACSI.) Please read the questions below precisely according to the script, and appoint a stenographer to take notes. As each discussion unfolds, you may follow up with comments and questions to strategically direct the flow of the discussion.

As the primary purpose of conducting the focus group is to collect qualitative information, general notes for each and every question should be taken in as detailed, rich, and thorough a manner as possible. In some cases, we request quantitative measurements. Please take counts and record as precisely as possible.

Watch for **(bolded notes in parentheses)** which will provide guidance to you, the facilitator, throughout the focus group. At the end of the focus group, you will see "Extra Questions." Please try, time permitting, to cover at least the first question in order of numerical priority (i.e., first Question 6, next Question 7, etc.)

At the end of the focus group, please add to the notes by providing clarification and context to ensure that the Shad Valley students'

message is properly recorded.

Introduction

Innovation increases competitiveness and productivity, contributing to a higher quality of living for Canadians. In February 2002, the Canadian federal government unveiled its Innovation Strategy, a major initiative designed to make Canada a leader in innovation.

As Shads from leading university campuses across Canada, you represent Canada's emerging leaders. By participating in this focus group, you will help shape tomorrow's public policy on innovation.

Firstly, we must come to terms with what it is we are talking about.

1. What does innovation mean to you?

2. How is innovation fostered and promoted at high school, other organizations, or programs? (What is working and what is not?)

3. Throughout your life, what types of experiences contributed most to your innovative orientation?

Ethics

Innovative research and frontier technologies are emerging with powerful potential for human betterment. Cloning, embryonic stem cell research, xenotransplantation, and genetically modified organisms are front-running examples of innovative cutting-edge technologies. However, these technologies challenge us to think through their ethical impacts.

4. In your opinion, how are innovation and ethics related?

5. At high school, have you been taught to think through the ethical and social impacts of emerging technologies from various stakeholder positions (e.g., patient groups, researchers, industry, developing nations?)

6. Considering your personal situation, where do you believe your own ethical compass (focus) originated?

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Exhibit 3 - Innovation Focus Group (Four Shad Valley Campuses)

Instructions to Facilitators/Notetakers:

Thank you for agreeing to facilitate a focus group on behalf of the Youth Advisory Committee on Sustainable Innovation (YACSI.) Please read the questions below precisely according to the script, and appoint a stenographer to take notes. As each discussion unfolds, you may follow up with comments and questions to strategically direct the flow of the discussion.

As the primary purpose of conducting the focus group is to collect

qualitative information, general notes for each and every question should be taken in as detailed, rich, and thorough a manner as possible. In some cases, we request quantitative measurements. Please take counts and record as precisely as possible.

Watch for **(bolded notes in parentheses)** which will provide guidance to you, the facilitator, throughout the focus group. At the end of the focus group, you will see "Extra Questions." Please try, time permitting, to cover at least the first question in order of numerical priority (i.e., first Question 6, next Question 7, etc.)

At the end of the focus group, please add to the notes by providing clarification and context to ensure that the Shad Valley students' message is properly recorded.

Thank you again for your support of our cause, which places youth and innovation at the fore in Canada. Should you have any questions, please contact Linda Wilson at (705) 495-6814 or linda@lindaandstan.com.

Introduction

Innovation increases competitiveness and productivity, contributing to a higher quality of living for Canadians. In February 2002, the Canadian federal government unveiled its Innovation Strategy, a major initiative designed to make Canada a leader in innovation. As Shads from leading university campuses across Canada, you represent Canada's emerging leaders. By participating in this focus group, you will help shape tomorrow's public policy on innovation.

Firstly, we must come to terms with what it is we are talking about.

1. What does innovation mean to you?

2. Developing an innovative orientation requires a variety of skills. In your opinion, what are these skills?
   (Facilitator to determine whether a consensus forms around key skills.)

3. Throughout your life, what types of experiences contributed most to your innovative orientation? What is working?
   (After concluding discussion on the positive question, please ask:)
   What is not working?

4. Do you believe that Canada is an innovative country?
   (Please provide specific number of Yes, No, and Uncertain responses.)
   Why?

5. Would you be interested in actively participating, along with other Shads, in a committee to advise the federal government on issues surrounding innovation, if such a committee were formed?
   (Please provide specific number of Yes, No, and Uncertain responses.)

6. In the future, would you consider taking a position in country outside Canada, if the position were innovation-oriented? **(Please provide specific number of Yes, No, and Uncertain responses.)**
   What other factors would influence your decision?

Ethics

Innovative research and frontier technologies are emerging with powerful potential for human betterment. Cloning, embryonic stem cell research, xenotransplantation, and genetically modified organisms are front-running examples of innovative cutting-edge technologies. However, these technologies challenge us to think through their ethical impacts.

7. Understanding that ethics vary from person to person, how should ethics be employed in the quest for innovation, and what are the implications?

8. How and by what process should ethical standards be developed to guide researchers in Canada?

9. At high school, have you been taught to critically consider the ethical and social impacts of emerging technologies from the respective perspectives of different stakeholders such as patient groups, researchers, industry, and developing nations, etc. **(Please provide specific number of Yes, No, and Uncertain responses.)**

10. Considering your own personal situation, where does your ethical compass (orientation) originate?

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Exhibit 4 - Focus Group / Survey (CYBF, ACE, As Prime Minister Awards)

Introduction

Innovation increases competitiveness and productivity, contributing to a higher quality of living for Canadians. In February 2002, the Canadian federal government unveiled its Innovation Strategy, a major initiative designed to make Canada a leader in innovation.

By participating in this focus group and offering your perspectives as youths, you will help shape tomorrow's public policy on innovation. We are presenting a paper next week to the federal government using the data from this focus group and others.

But before we discuss innovation, firstly, we must come to terms with what we are talking about.

1. What does innovation mean to you?

2. Developing an innovative orientation requires a variety of skills. In your opinion, what are these skills?

3. Throughout your life, what types of experiences contributed most to your innovative orientation? What is working? And what is not working? (i.e., What prevents young people from being more innovative?)

4. Do you believe that Canada is an innovative country? Why?

5. In the future, would you consider taking a position in a country outside Canada, if the position were innovation-oriented?

6. What other factors would influence your decision to take a position in a country outside Canada?

7. Are there innovative thinking principles that can be applied across disciplines (from political science, to business, to science) or would innovative thinking principles be different for each area?

8. If innovation and innovative thinking could be taught, when and where do you believe it would most effectively be taught?

9. In your own experience, what has played the most significant role in your innovative orientation?

    environment
    mood
    exposure to formal innovative-thinking courses
    other (identify)

10. How can associations, schools, organizations, universities, and businesses serving youth produce increasingly innovative young Canadians?

11. The government is its innovation agenda has identified four challenge areas. What advice do you have for the federal government in these areas?

    Bringing new knowledge to market area challenge
    Skills challenge
    Business and regulatory environment challenge
    Creating strong communities challenge

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